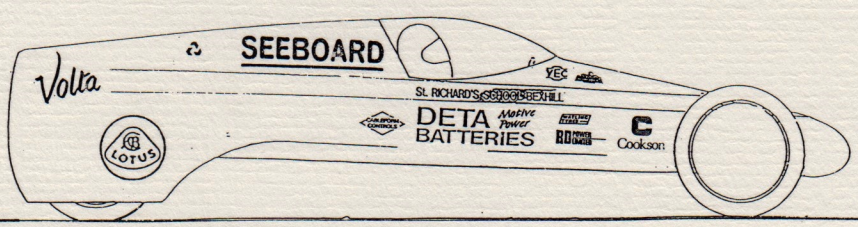
Volta

WORLD LAND SPEED RECORD ATTEMPT 1993



The team are planning to involve other pupils of the school and the local community by using this record breaking attempt to raise money, by sponsorship, for

ST. MARY'S SCHOOL, WRESTWOOD ROAD, BEXHILL-on-SEA.
(St. Mary's Wrestwood Educational Trust)

This is a highly regarded local residential and day school for children with speech and language problems who also have physical disabilities and is a registered charity worthy of financial support.

St. RICHARD'S R.C. SCHOOL

ASHDOWN ROAD, BEXHILL-ON-SEA, EAST SUSSEX. TN40 1SE
TELEPHONE: BEXHILL-ON-SEA (0424) 731070

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THE BRIEF

The current FIA INTERNATIONAL RECORD, CATEGORY A, GROUP VIII, CLASS 1 (ELECTRIC POWERED VEHICLES UNDER 500 kg.) stands at:

1km - Flying start 100.242 mph (161.424 km/h)

The record was set on July 6th 1981 by Jens Knoblock at Hockenhein, Germany.

PROJECT VOLTA is a serious attempt by a group of past and present pupils of St Richard's School, Bexhill-on-sea, to break this WORLD RECORD.

THE TARGET: The aim is to establish a new and substantially higher record at over 120 mph (200 kp/h).

We hope to be ready to make the attempt in the Spring of 1993, most likely sometime in March.
The venue will probably be RAF ELVINGTON, Yorkshire.

The main aim of the venture is to establish a new FLYING START KILOMETRE WORLD LAND SPEED Record but at the same time the team intend to set several new BRITISH and INTERNATIONAL records, in the same category, particularly the
STANDING START KILOMETRE and the
STANDING START MILE.

For the main record breaking attempts the car will be driven by RUDY THOMANN, a highly regarded International Group C racing driver and Lotus Development Engineer and Test Driver. Rudy was the Project Manager responsible for the revolutionary OLYMPIC GOLD MEDAL winning LOTUS BIKE.

CHRIS FAIRHURST will also drive the vehicle and attempt to set new records in this category.

Volta

THE TEAM

Peter Fairhurst. B.Ed (Hons).
A graduate Art/Craft teacher with over twenty years experience (18 at St Richard's).
Organiser of teams of car-building pupils at the school since 1975 and leader of St Richard's School Young Engineers Club.
Project manager.

Matthew Harrison. B.Eng (Hons).
Past pupil 1980 - 1985.
Phd. student, Southampton University in Computational Fluid Dynamics.
Research Engineer, Lotus Engineering.
Area of responsibility: Technical design.

Colin Sayers
Past pupil 1971 - 1976
Member of the first St Richard's School car building team 1975/76, Finalist at BP Buildacar Competition 1976.
Sheet metal worker and welder, main responsibility: chassis welding and component fabrication.

Chris Fairhurst
Past pupil 1979 - 1984
Member of the school B.P. Buildacar teams of 1980 and 1982.
Formerly employed by Imperial Specialist Vehicles producing kit cars and currently a maintenance and repair mechanic.
Main responsibilities: mechanical assembly, development and test driving.

PRESENT PUPILS:

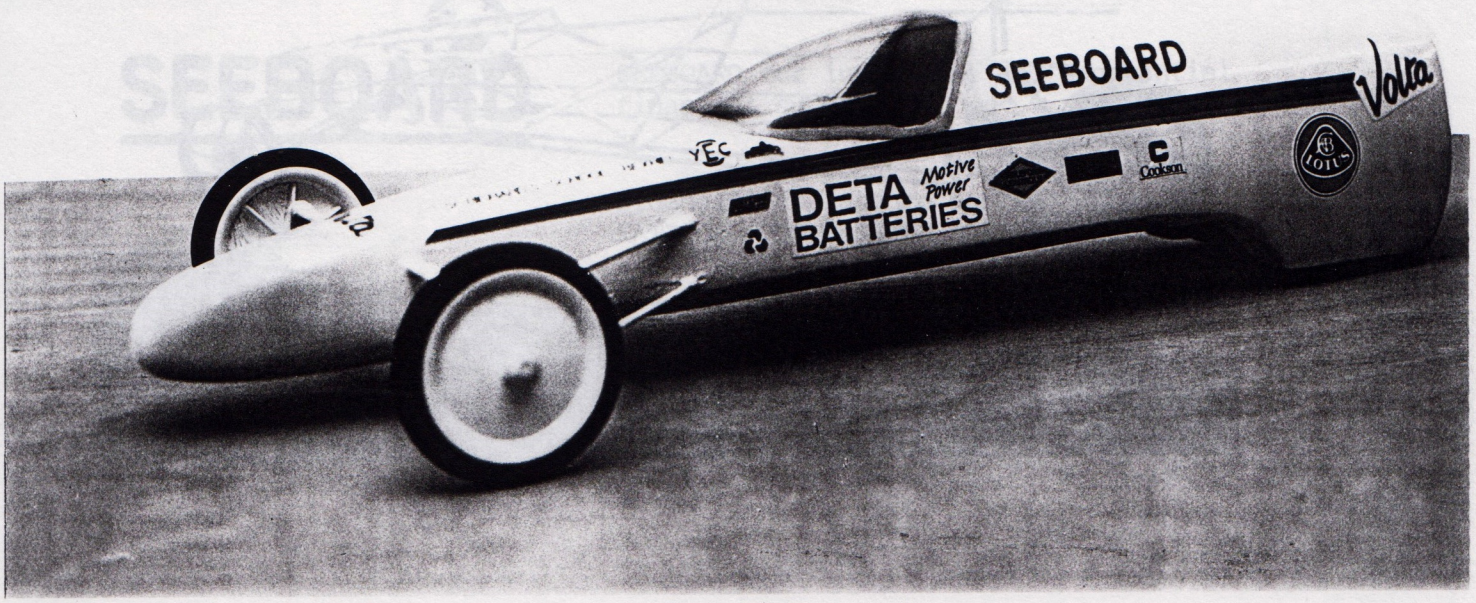
Bella Harrison
Vicki White
Ben Richardson
Chris Duncan
The pupils, members of St Richard's Young Engineers Club, are involved in all aspects of the project and will be following the long established tradition of learning by being members of a team committed to seeing a project through to a satisfactory conclusion.

Volta

THE VEHICLE

Dimensions:	Length:		4500
	Height		1050
	Front track		1800
	Rear track		590
	Wheels/tyres.	Alloy.	3.50 x 18
Suspension components:			
	Front:	Fabricated wishbones, coil-over shocks.	
	Rear:	Trailing arms, coil-over shocks.	
Power:	96volt, series wound, D C motor Output: 45 kw,250 Nm torque.		
Batteries:	Deta automotive lead acid batteries. 8 X 12volt type 57220 'Hochstrom'.		
Speed Control:	FKI Cableform 9000 Series Microprocessor Controller with plug braking facility.		
Frame:	Flat oval mild steel tube, covered with a KEVLAR / NOMEX honeycomb sandwich body.		

The on-board drum brakes and plug braking will be augmented by a parachute for the record breaking attempt.



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St. RICHARD'S SCHOOL and the PROJECT VOLTA TEAM are delighted to acknowledge the encouragement and very necessary advice and help from the following:

OUR TECHNICAL TEAM.

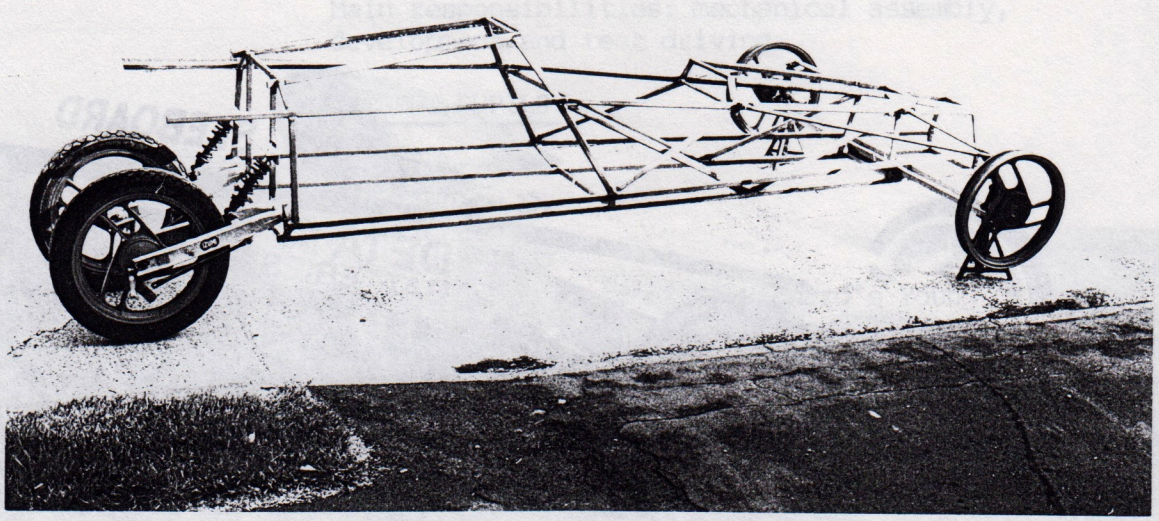
Dr. Jurgen Gorg, Dipl-Ing.
DETA Akkumulatorenwerk Gmbh. Bad Lauterberg. Germany.

Frank W. Baker, B.Sc(Eng), C.Eng., MIEE.
FKI CABLEFORM Ltd. Sowerby Bridge, West Yorks.

Richard Hill, Aerodynamicist and Senior Development Engineer, LOTUS ENGINEERING Ltd., Hethel, Norfolk.

Rudy Thomann, Senior Development Engineer, Test Driver and International Group C Racing Driver.
LOTUS ENGINEERING Ltd. Hethel, Norfolk.

Ken Boake, B.Sc.(Hons), AMIEE.



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THE SPONSORS

At this stage of the project (November 1992), several companies have agreed to be involved, making the attempt possible by offering goods, services and financial help.
The team are very grateful to:

YOUNG ENGINEERS
TOMORROW'S IDEAS TODAY

The national YOUNG ENGINEERS CLUBS who have financed the building of the frame and some suspension components.

DETA Motive Power BATTERIES

DETA Batteries, through D.J. DISTRIBUTION, who have agreed to supply the batteries and full technical support.

RD POWER LIMITED

R D POWER who have supplied equipment to keep the batteries charged for the testing programme prior to the record attempt.

CABLEFORM CONTROLS

F K I CABLEFORM who have agreed to supply a 9000 Series Microprocessor Controller and full technical support.

LOTUS

LOTUS ENGINEERING who will be providing the lightweight KEVLAR body which will be made by their COMPOSITES DIVISION.

WATLING TYRES

WATLING TYRE SERVICES who will be providing the high speed AVON tyres for the vehicle.

ROADHOG MOTOR SPARES for material help.

PENDRAGON SIGNS for vinyl graphics.

SEEBOARD

SEEBOARD for invaluable and substantial financial support.

ROADHOG

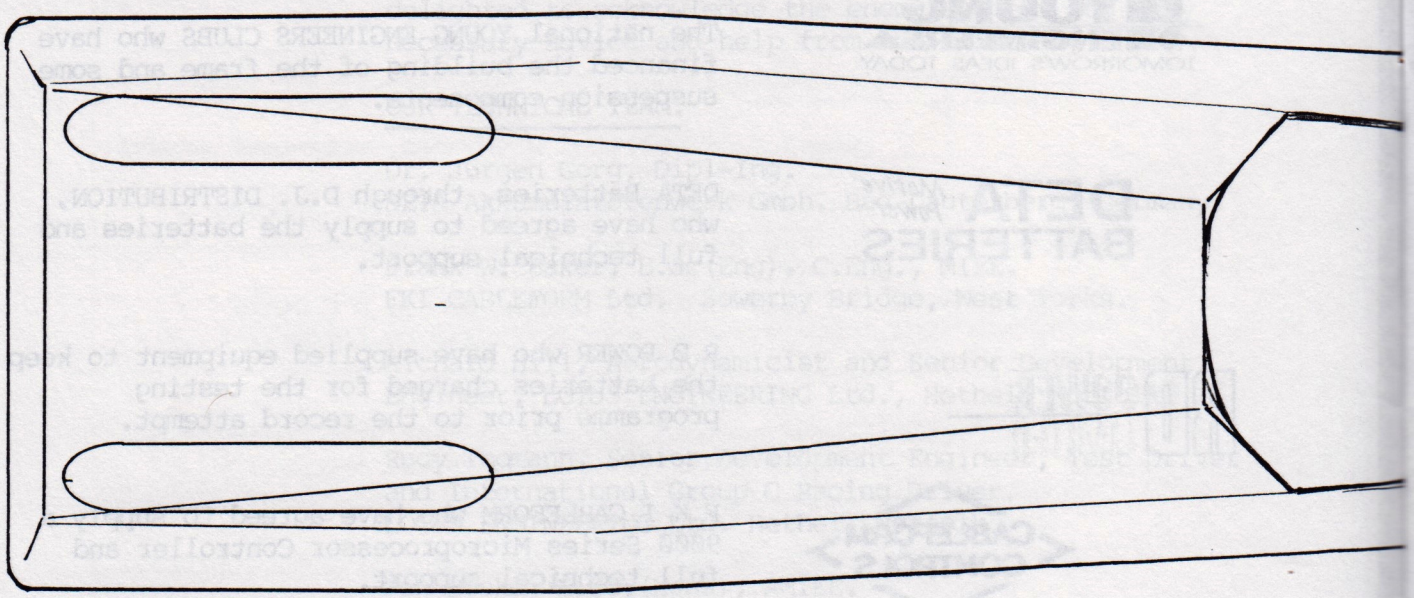
Financial assistance has also been given by:
NATIONAL WESTMINSTER BANK PLC,

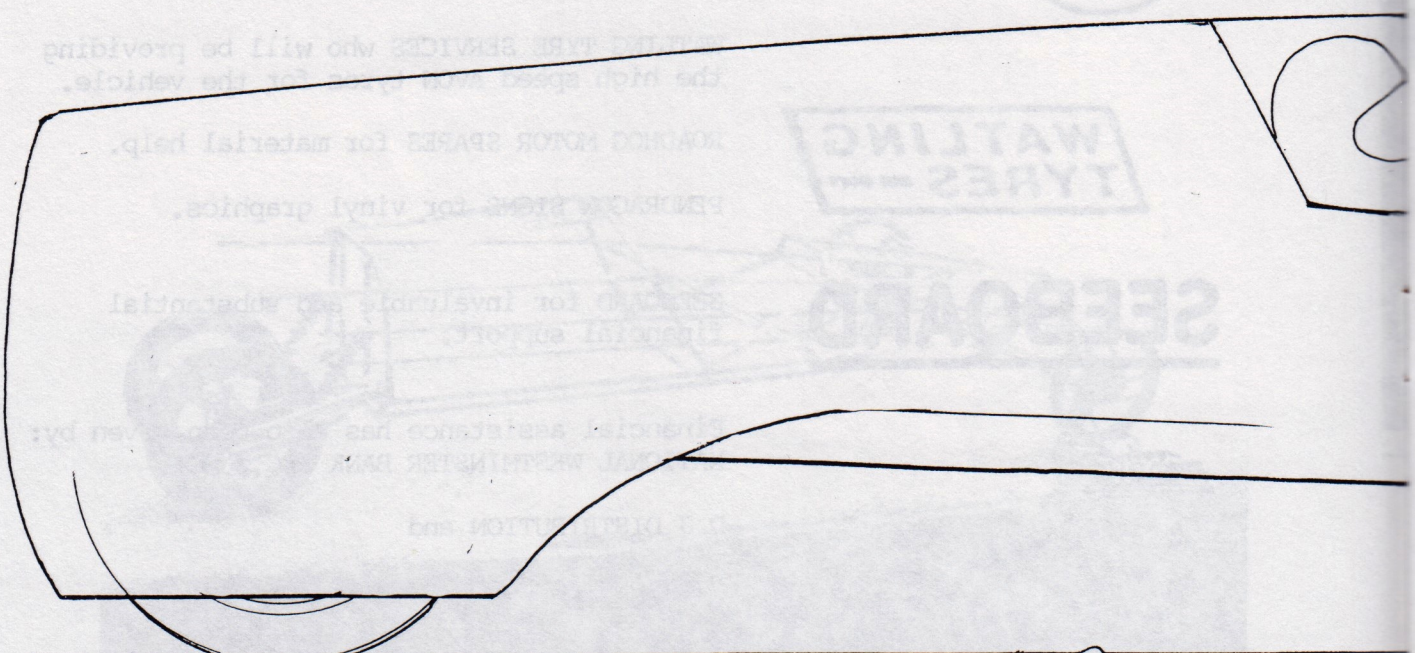
D J DISTRIBUTION and

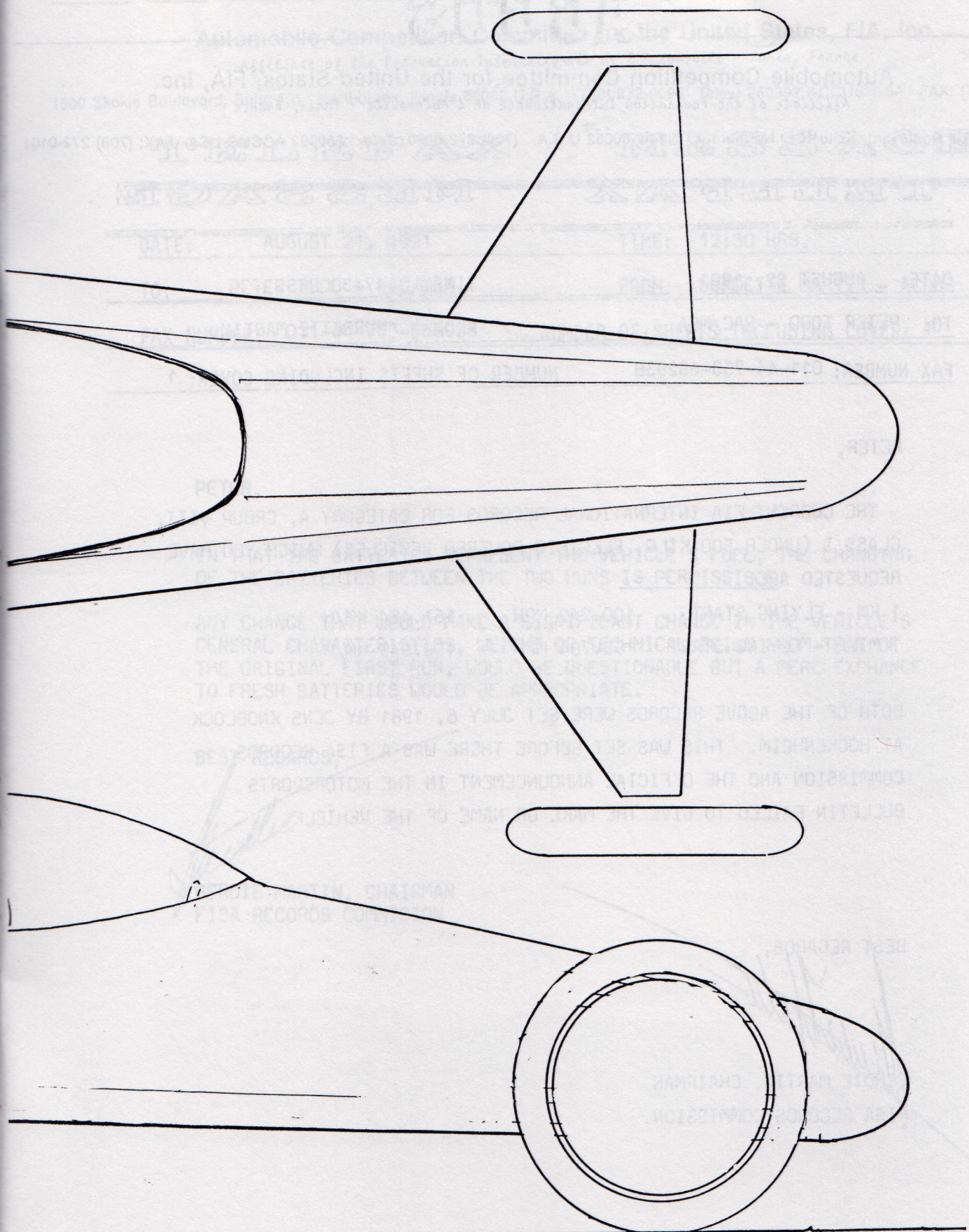
Cookson

COOKSON TECHNOLOGY CENTRE (Oxford)

Volta







St.RICHARD'S SCHOOL BEXHILL. WORLD LAND SPEED RECORD ATTEMPT 1993

ACCUS

Automobile Competition Committee for the United States, FIA, Inc.
Affiliate of the Federation Internationale de l'Automobile - Paris, France
1500 Skokie Boulevard, Suite 101 Northbrook, Illinois 60062 U.S.A. (708) 272-0090 Telex: 280392 ACCUS USA FAX: (708) 272-0101

TELEFAX MESSAGE

DATE: AUGUST 22, 1991 TIME: 17:30 HRS.

TO: PETER TODD - RAC/MSA FROM: BURDETTE MARTIN

FAX NUMBER: 011-44-753-682938 NUMBER OF SHEETS INCLUDING COVER: 1

PETER,

THE CURRENT FIA INTERNATIONAL RECORDS FOR CATEGORY A, GROUP VIII, CLASS I (UNDER 500 KILO, ELECTRIC POWERED VEHICLES) WHICH YOU HAVE REQUESTED ARE:

1 KM - FLYING START	100.242 MPH	161.424 KM/H
1 MILE - FLYING START	98.704 MPH	158.849 KM/H

BOTH OF THE ABOVE RECORDS WERE SET JULY 6, 1981 BY JENS KNOBLOCK AT HOCKENHEIM. THIS WAS SET BEFORE THERE WAS A FISA RECORDS COMMISSION AND THE OFFICIAL ANNOUNCEMENT IN THE MOTORSPORTS BULLETIN FAILED TO GIVE THE MAKE OR NAME OF THE VEHICLE.

BEST REGARDS,

BURDIE MARTIN, CHAIRMAN
FISA RECORDS COMMISSION

ACCUS

Automobile Competition Committee for the United States, FIA, Inc.
Affiliate of the Federation Internationale de l'Automobile - Paris, France
1500 Skokie Boulevard, Suite 101 Northbrook, Illinois 60062 U.S.A. (708) 272-0090 Telex: 280392 ACCUS USA FAX: (708) 272-0101

TELEFAX MESSAGE

DATE: AUGUST 21, 1991 TIME: 12:30 HRS.

TO: PETER TODD - RAC/MSA FROM: BURDETTE MARTIN - ACCUS

FAX NUMBER: 011-44-753-682938 NUMBER OF SHEETS INCLUDING COVER: 1

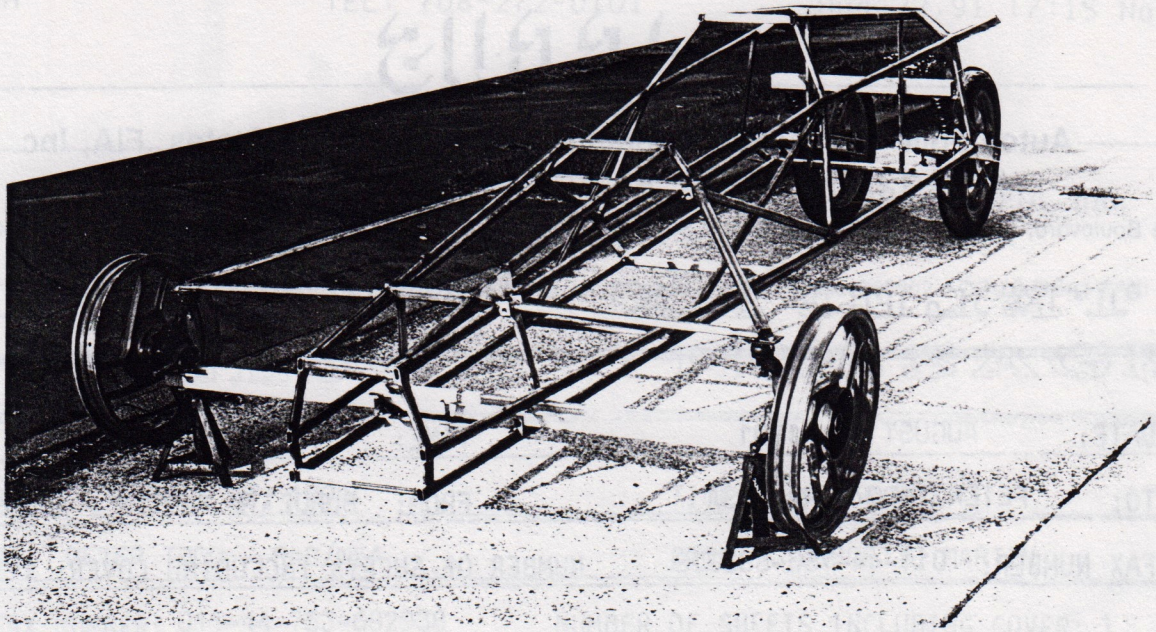
PETER,

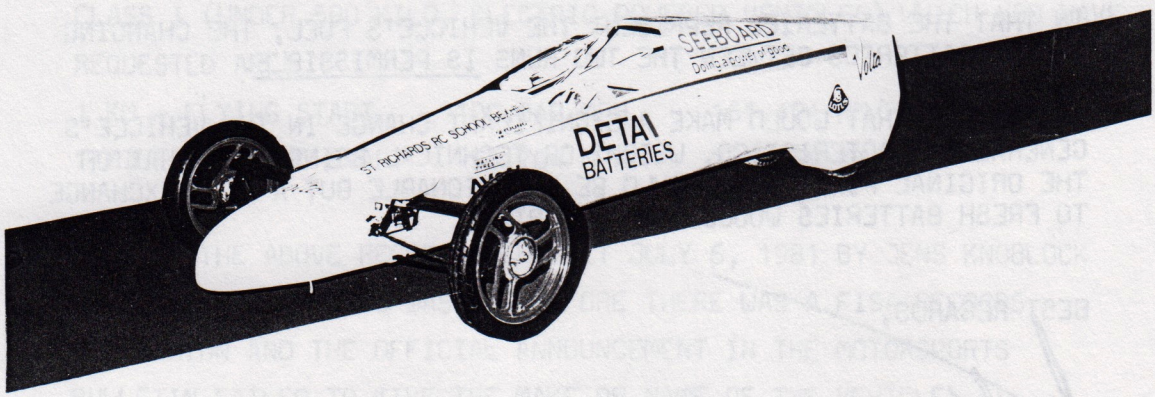
IN THAT THE BATTERIES REPRESENT THE VEHICLE'S FUEL, THE CHANGING OF THE BATTERIES BETWEEN THE TWO RUNS IS PERMISSIBLE.

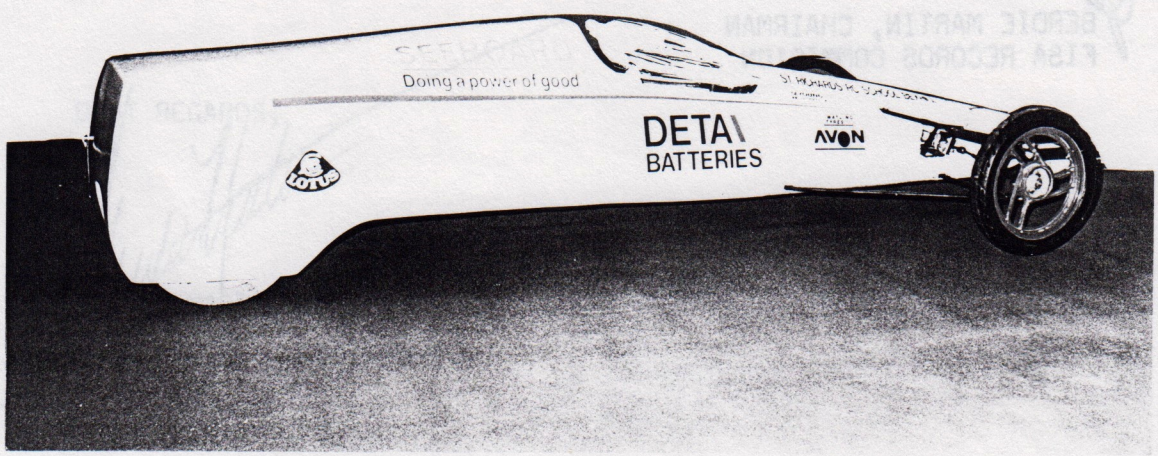
ANY CHANGE THAT WOULD MAKE A SIGNIFICANT CHANGE IN THE VEHICLE'S GENERAL CHARACTERISTICS, WEIGHT OR TECHNICAL BEING FROM THAT OF THE ORIGINAL FIRST RUN, WOULD BE QUESTIONABLE BUT A MERE EXCHANGE TO FRESH BATTERIES WOULD BE APPROPRIATE.

BEST REGARDS,

BERDIE MARTIN, CHAIRMAN
FISA RECORDS COMMISION




SEEBOARD
Doing a power of good
DETA
BATTERIES


Doing a power of good
DETA
BATTERIES
AVON

Volta

THE SCHOOL

St Richard's R.C. School was opened about thirty years ago to serve the Catholic communities of Bexhill, Hastings, Eastbourne and the surrounding area.
There were initially about 300 pupils on role but the school has grown and now serves over 600. Academic and social standards are very high and further growth is planned to increase the number of places to meet the demand from parents and pupils.

Pupils from St Richard's have been involved in car building projects since their entry in the 1976 BP Buildacar Competition.
Several of the cars are still in use:
An invalid car built in 1982 is now used by a local church to carry wheelchair bound worshippers to and from services each Sunday and on Summer Holidays to the West-country.
A replica Riley sports car is still taxed and used each summer. The Delta three-wheeler, built in 1988, is now on display in an Eastbourne Motor Museum.
The most successful project, RICHELLE (St Richards's Electric), overall winner of the 1990 BP Buildacar Competition, is still in regular use and continues to promote the School and DETA Batteries, it's main sponsor.

EAST SUSSEX COUNTY COUNCIL

Headteacher:
A. Campbell, M.A., B.Ed., Dip.R.Ed.

This car brings joy to Jane

19 81

International Year of Disabled People

BRINGING happiness to a rainy day, the special Minion Inca invalid car which pupils of St Richard's School have spent a year building for Jane Hancock of Oakleigh Road has been presented to her.

The car was specially designed and built to carry the long wheelchair to which Jane, a multiple sclerosis victim, is confined. The work was done by Mr Peter Fairhurst, head of metal-work, plus a team of pupils who worked often through the night.

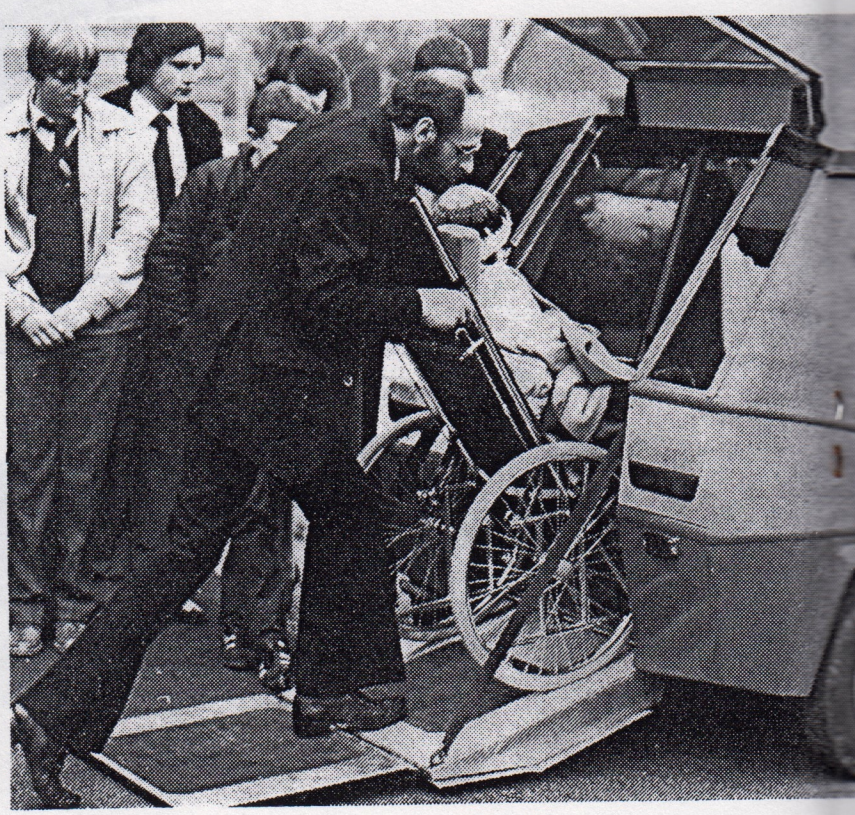
Mrs Babs Hancock, Jane's mother, said "It's a happy day, grey and rainy, but happy for us."

Jane heard a specially taped message, after she had been hoisted into the car. She was then taken for a short drive, after which her mother commented "Jane's life if absolutely transformed. It will add a new dimension to her life."

After the presentation was a buffet meal prepared by cordon bleu cook Jan Roche, of Fyning Place. Jan also made a special cake in the shape of the car for the occasion.

Above: The St Richard's School Minion makers. Peter Fairhurst is the one with beard! Below: Peter demonstrates a real hatchback which will enable Jane to be far more mobile than could have been envisaged before Minion.

Jane Hancock's mother, Babs, has to lend a hand with the hoist to get Jane chairbound.



Whistle stop wonders!

A WHIRLWIND week-long tour aking in some of the country's atest engineering marvels has een the prize for three Bexhill tudents and their tutor.

They were three of the four-nember team from St Richard's RC comprehensive who won last ear's national BP Buildacar con-est with their Richelle electric ehicle.

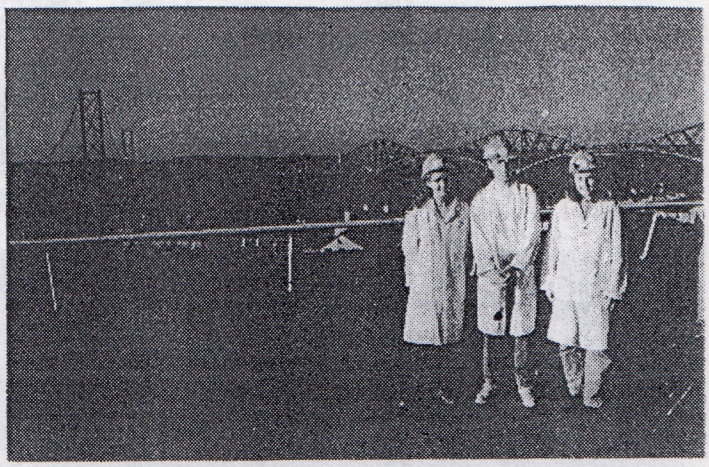
As prizewinners with the design n this year's Young Engineers for Britain contest, Sandra Forte, Eleanor Reed and Steven Jones, ogether with craft design tech-ology master Peter Fairhurst for-ned part of a seven-school party who toured the British isles.

Mr Fairhurst said after: "It was one of the most incredible experiences of my life."

Just some of the tour highlights included the Channel Tunnel workings, the Dartford bridge, the Ford Motor Company research establishment at Dunton, Stanstead Airport, Jodrell Bank radio telesope, ICI's Runcorn works, the Liverpool docks reclamation project, the Mersey Tunnel and lunch in the Liverpool FC directors lounge!

Mr Fairhurst said: "It was an unforgettable experience."

The youngsters have each been awarded Grade Three City and Guilds passes - equal to Grade A GCSE passes — for their work.



● *Young Bexhill engineers Eleanor Reed, Steven Jones and Sandra F pause for a double take of the two Forth road bridges.*

YOUNG ENGINEER FOR BRITAIN

Martin Rutherford, a former pupil at St Richards RC School, Bexhill and now a National Diploma in Engineering student at Hastings College of Arts and Technology was awarded first place in the Class B Individual Entrant 15-16 Years Category of the Young Engineer for Britain competition organised by the Engineering Council ... and to cap it he recently appeared on Television.

Martin created a computer management system for motor vehicles which replaced conventional instruments and switching, and added route planning, vehicle management and maintenance.

Martin paid tribute to those who had helped him, including Mr Fairhurst from St Richards School and Mr Ian Casselden of Hastings firm Interface Devices, as well as Texas Instruments.

Martin's prize, from the Plastics and Rubber Institute, was £400 which was shared with his school and an industrial visit to Unilever.

He reached the National Final after winning through the regional finals, organised by SATRO in Southampton, where there were 450 entrants across all categories. In the National Final, held in the National Westminster Hall in the City of London, he beat 10 others in his class. Prizes were presented by Sir William Barlow F Eng, the Chairman of the Engineering Council.

In presenting the prizes Sir William pointed out that the sophistication of the entries was progressing and improving each year.

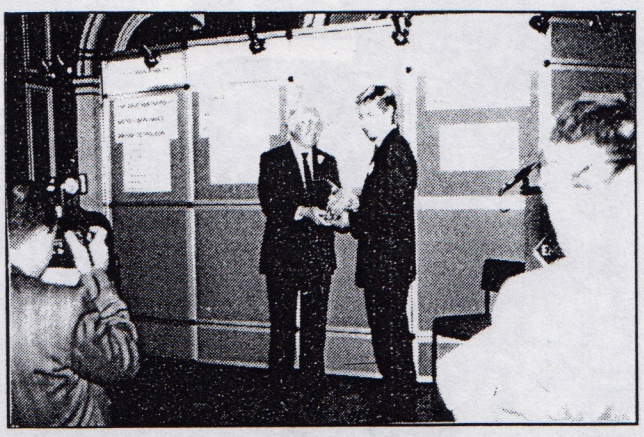
"The entries themselves are increasingly related to real-life problems met in industry. We have been trying over the years to introduce this industrial relevance and the theme of 'Who wants to be a Millionaire?' has been helping some entries each year towards commercial success."

He pointed out that last year's outright winner had already sold the right to his invention - a sophisticated radio transmitter alarm system. He continued, "I hope that is setting him on the way to being a budding entrepreneur."

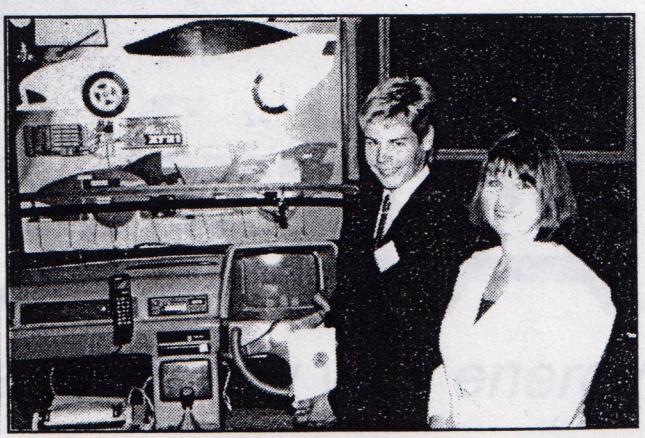
The principal sponsors of the competition were directory publishers Dial Industry Publications and The National Westminster Bank. Others included DTI, British Aerospace, BP, Courtaulds, GEC, ICI, Ove Arup Partnership, Shell, TI Group, Unilever, Vickers and Wimpy.

Prizes and other support were provided by industrial companies, professional engineering institutions and educational bodies.

Another East Sussex firm involved was Parker Pen of Newhaven, which provided an industrial visit for the winner of the 11-14 years category.

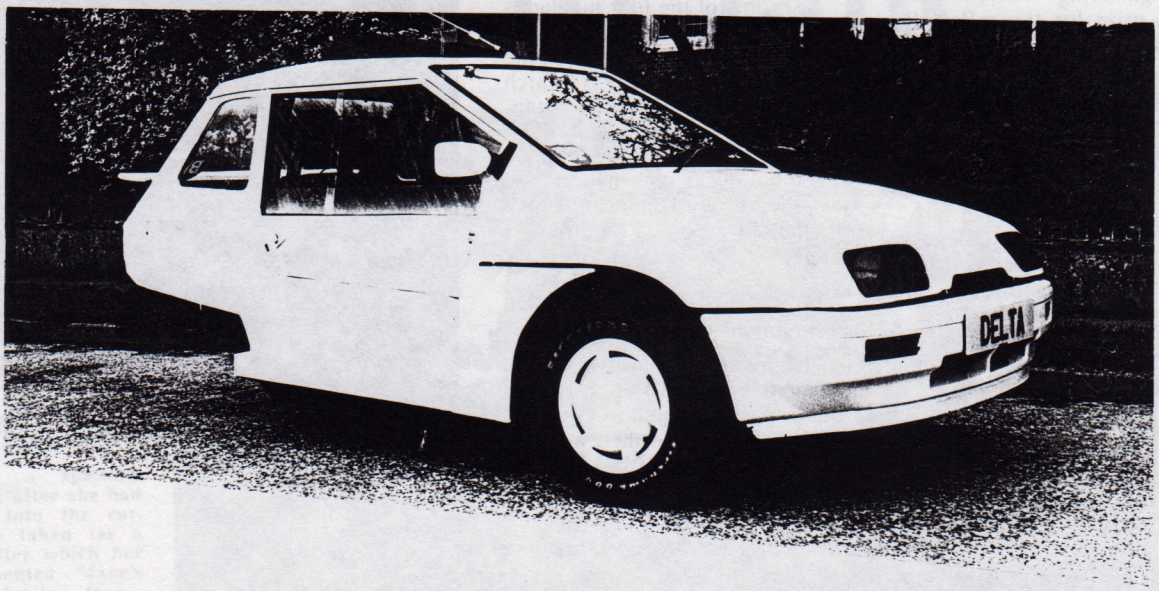


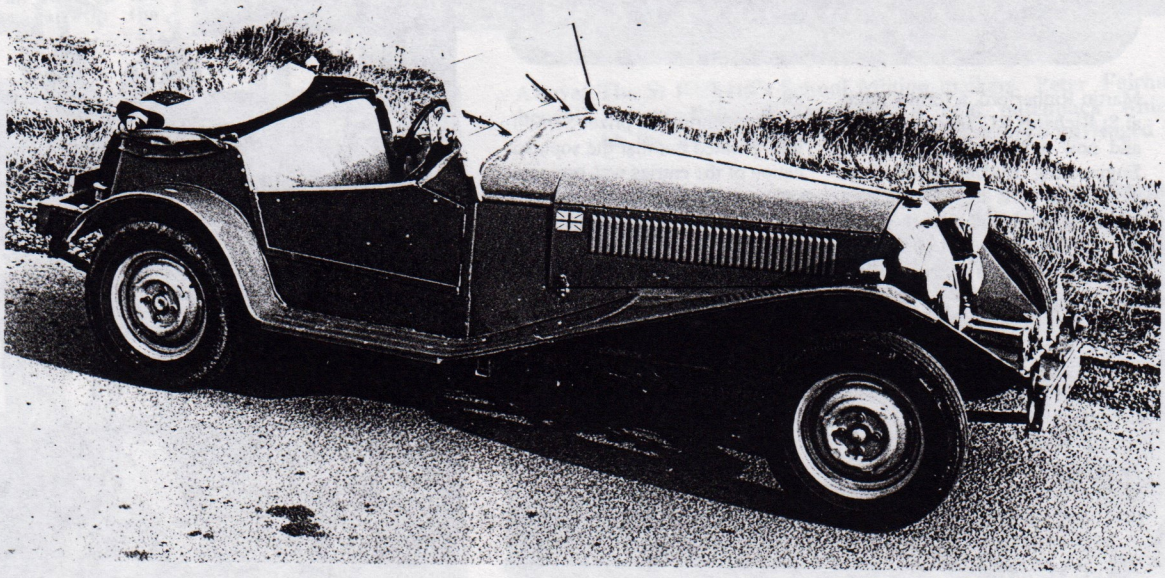
Martin receives his prize from Sir William Barlow



Martin and his proud Mother with the winning entry

1988 VOLKSWAGEN GOLF BASED THREEWHEELER

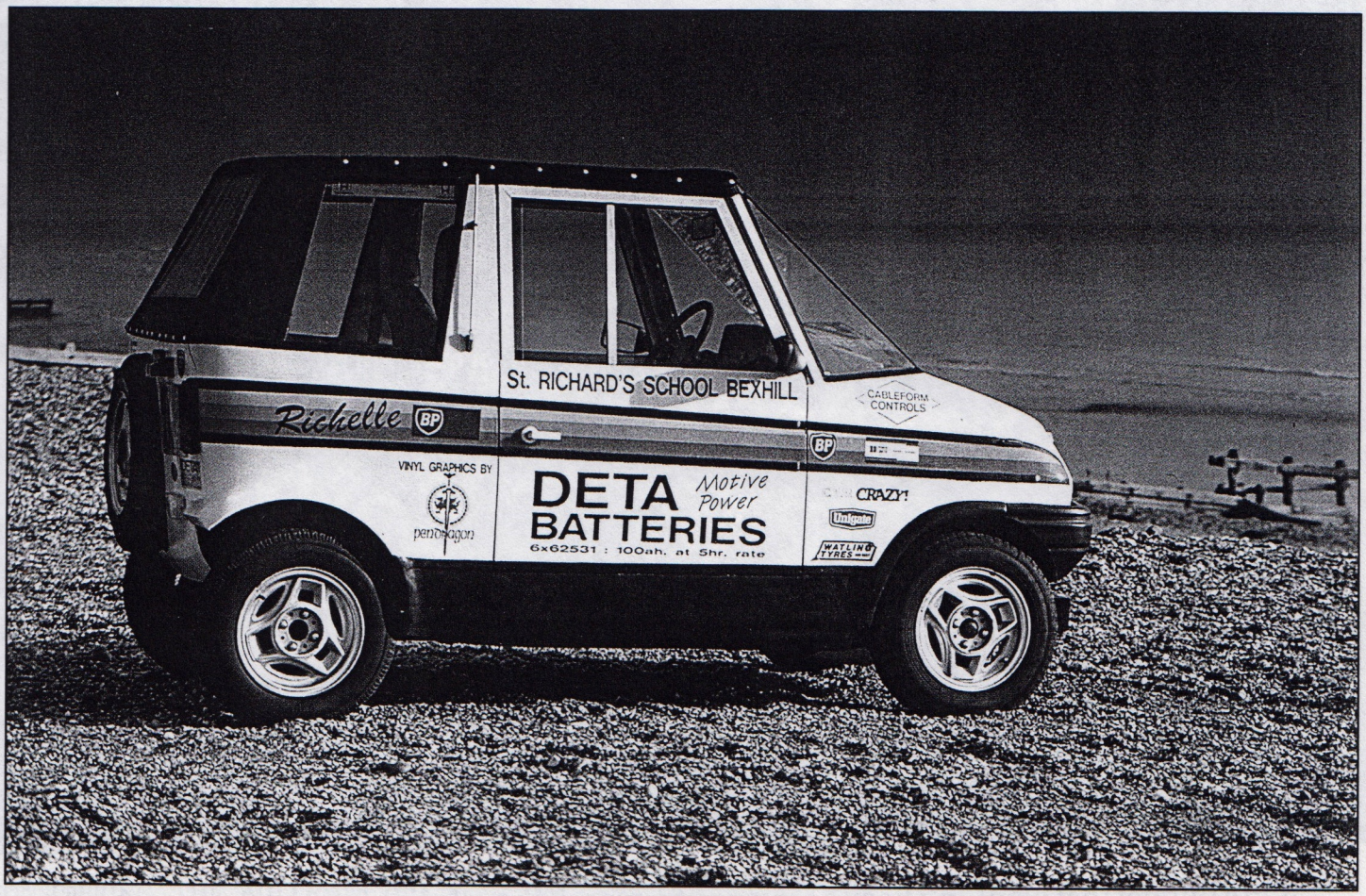




1982 RILEY TWO SEATER SPORTSCAR.

AUTOCAR & Motor

REPRINT

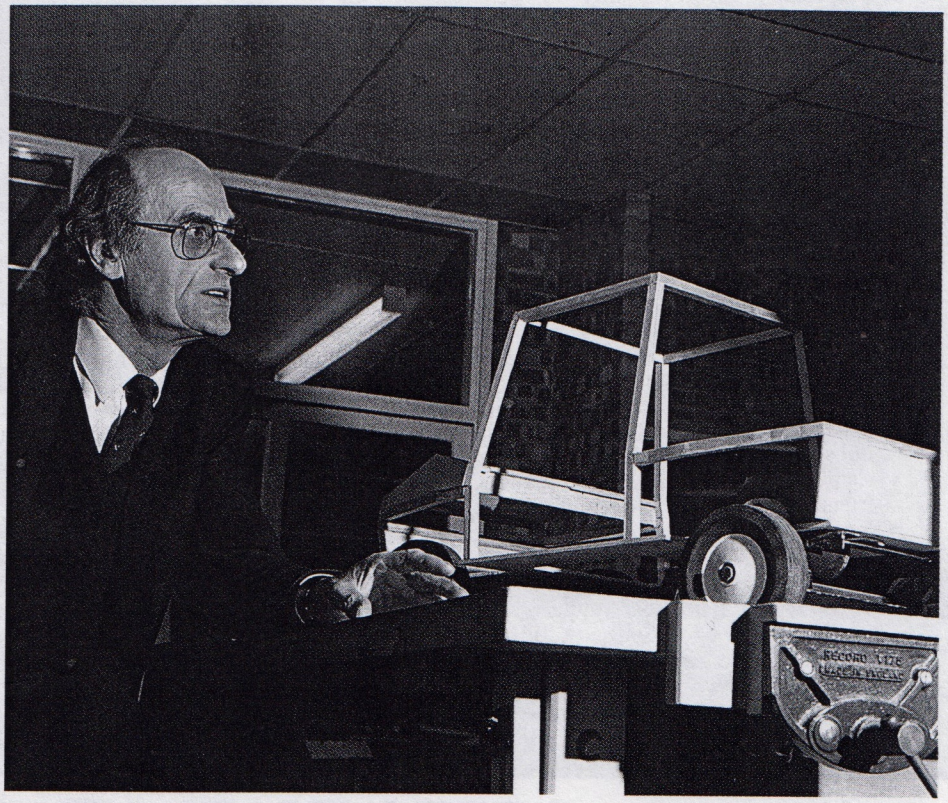


DETA

... the company with energy

On a budget that wouldn't keep a car manufacturer in paper clips for a week, one school teacher and four of his students have built an electric car good enough to win the 1990 BP Buildacar competition and leave technical editor Jesse Crosse enormously impressed by their ingenuity and application, and the car's ability and potential. Photography by Peter Burn

BATTERIES NOT INCLUDED



School teacher Fairhurst is a serious devotee of different forms of the electric car. Latest creation is the Richelle, based on a Fiat camper van

CONSIDERING THE MILLIONS OF dollars and deutschmarks manufacturers spend in an effort to develop a practical electric car, St Richard's comprehensive school in Bexhill-on-Sea has done rather well.

In just a few months, four pupils under the direction of craft, design and technology teacher, Peter Fairhurst, built a road legal electric car mainly from scrap items.

Called the Richelle (derived from 'St Richard's Electric'), the car's looks belie its humble origins. Under the futuristic looking exterior are some mundane bits and pieces. But it's the combination of these, and the imaginative way in which they have been stitched together, that makes the little car such a success.

Fairhurst (who now uses the Richelle to drive to work) is no stranger to this kind of project. With the help of various generations of pupils, he's built a number of bizarre vehicles over the years. There was the BEE in 1976, for instance, a Mini-based city car. The Austin-based Minion followed in 1978 together with the Electropet, comprising a Viva bodyshell, Austin 1300 front subframe and two 1300 subframes at the rear. It might not have looked much, but, given current trends, the concept was significant. The Electropet was a hybrid, with petrol power at the front and electric power at the rear.

An invalid vehicle called the Inca followed in 1980. Austin 1300-based again, the Inca is rear loading and practical enough to still be in regular use today, providing transport for some of Bexhill's wheelchair users.

In 1980 the school built its first all-electric car, the 'Electrosix', again based on a Viva. Incidentally, the two-year intervals between projects coincided with BP's Buildacar competition. Launched in 1972, the competition is part of BP's 'Challenge to Youth' scheme intended to help youngsters ready themselves for industry. The idea is for participants to develop design and technology skills, to get a feel for the financial aspects of forming an economical project and to learn to work together as a team.

The Electrosix was to be the last entry for a few years because Fairhurst wanted to pursue the possibilities of manufacturing and marketing kit cars. Unfortunately the business wasn't a success, but more free time meant he was able to lead a fresh contingent of teenage troops into action in 1988 with a Golf-based three-wheeler.

On that occasion, the trophy was taken by the Royal Grammar School, Worcester, and its 1-litre 'boxy', a vehicle designed specifically for transporting games equipment. But Fairhurst and his crew remained undeterred and, in July 1989, £30 worth of Fiat 900 camper became the basis for a new Buildacar entrant, the Richelle.

The four students involved were Steven Jones (14), Eleanor Reed (15), Sandra Forte (15) and Elizabeth Hawes (16) and all had their work cut out to get the project finished for 15 October 1990 when the entries were to be marked by army and civilian judges at the Royal Electrical and Mechanical Engineering headquarters at Borden in Hants.

The team built a wooden model to start with. Then, on the basis of the model and some drawings, work began on the car itself. The camper was reduced to a floorpan and ▸

◀suspension, and the first task was to move the pedals, seating position and steering box backwards, since all overhung the front axle in the original. The short-wheelbase Fiat has semi-trailing arms at the rear and double wishbones at the front and those bits were left alone.

Richelle's body is based around a space frame which ends at the B-pillar position because the car was originally going to have an open back, a plan subsequently ditched. The spaceframe was cut by the girls on a small bandsaw from 40mm (1.6ins) square rectangular hollow-section steel tube with a 2.5mm (1ins) wall thickness, and arc welded together by Fairhurst. Rear axle components include a Triumph Spitfire differential, with specially machined driveshafts to mate it to the Fiat hubs. The camper's brakes were in pretty poor shape and had to be completely rebuilt, and the friendly scrapper again provided an Alfa Romeo steering column to complete the picture.

Power was to be electric, of course, but that is not quite as simple as it first appears. The team would need a motor for a start. "I think it's a 72-volt motor," explains Peter Fairhurst. "I tracked it down at the Unigate Dairies transport depot at Headcorn in Kent, where they have a sort of graveyard for milkfloats."

The propshaft is from a milkfloat, too, and proved to be a perfect fit. The motor is controlled by a 'thyristor chopper' unit from a fork lift truck. This device looks not unlike a large voltage regulator and in response to a footpedal control, switches the power to the motor on and off very quickly. The faster that happens, the more power the motor gets and the more torque it develops. It's a system which doesn't waste electricity by placing a resistance in the circuit (like rheostat devices) and is therefore tailor-made for battery-powered vehicles where power cannot be squandered. The whole lot, including the 'Pulsomatic MkX speed controller', was secured for £50.

Battery power isn't cheap, and finding suitable batteries wasn't easy. "You need special 'traction' batteries for this job," Fairhurst explains. "The best offer I got from a major company was 40 per cent off, and I needed six batteries. We just didn't have that kind of money."

In fact, the team had very little money at all, The school certainly didn't have the funds and Fairhurst has financed much of it himself. Sponsorship therefore, in the shape of 'hardware contributions', was essential to the project's success, and fortunately a saviour came along in the shape of PB Batteries in Derby which put Peter Fairhurst in touch with Deta of Stafford, importer of the German batteries of the same name.

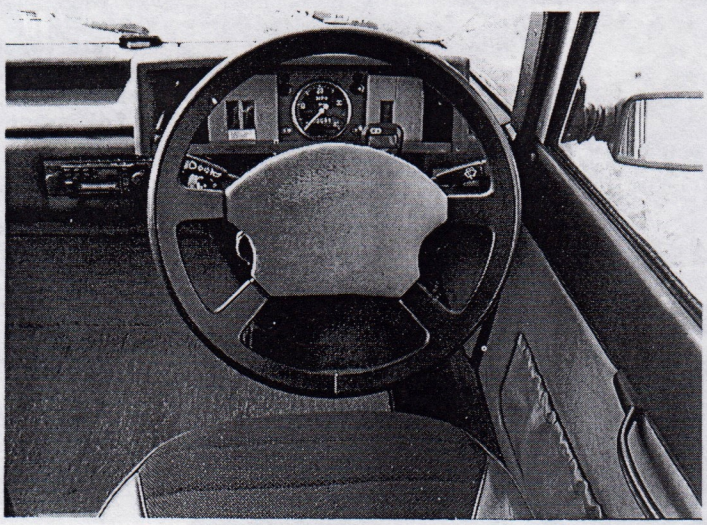
"David Johnson at Deta offered them at cost price. I finally convinced him to give me six," remembers the optimistic Fairhurst. "I charge them with an ancient milkfloat battery. Trouble is, it only works at five or 15 amps and I should be charging them at 10."

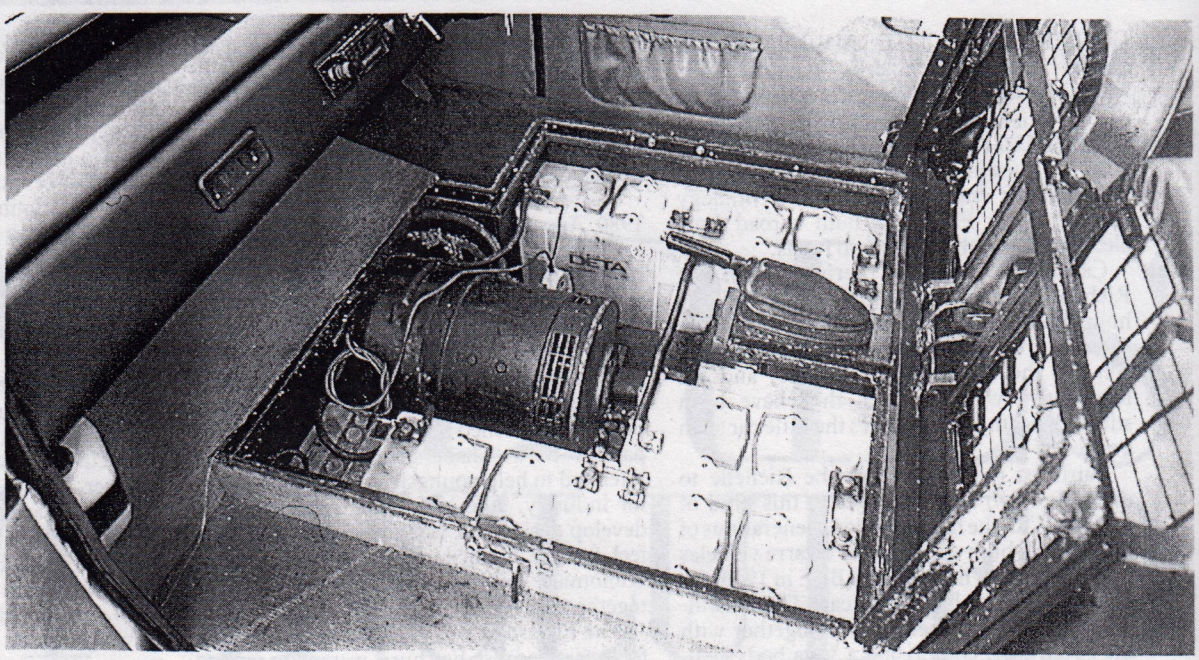
The batteries provide an effective 80 amps of power and are arranged in series to drive the motor at 72 volts. That should be enough to drive the car flat out for an hour or so, which means a range of around 30 to 35 miles.

Cableform of West Yorkshire supplied the team with a 'field weakening' controller which reduces the current in the motor's field coils when load reduces. That, thinks Fairhurst, should increase range by 40 per cent. A regenerative braking system (where the engine generates power under deceleration) is also on the way and should increase range by a further 12 per cent.

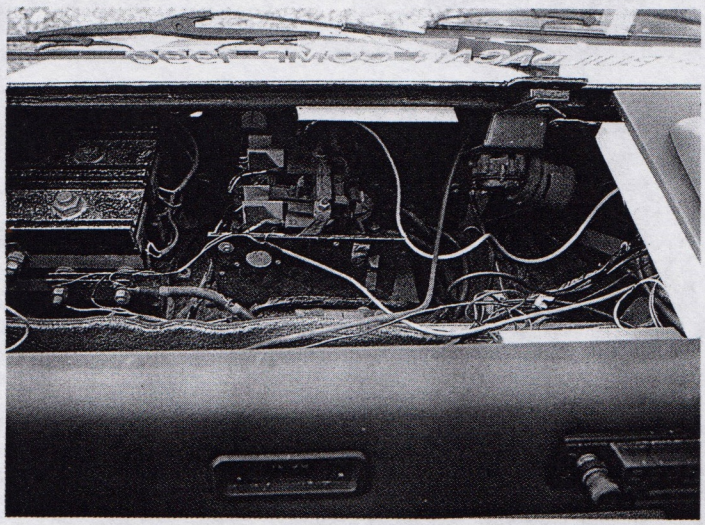
The motor sits smack in the middle of the chassis under the floor between the front seats, while the controller is mounted under the front dashboard.

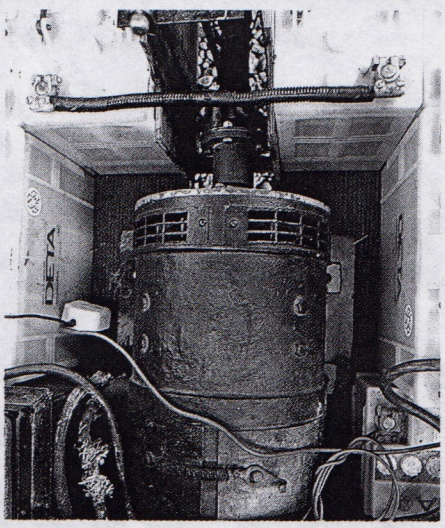
And the rest? Seats, thinks Fairhurst, are from a Datsun 120Y, Bertone wheels from a scrapped Fiat X1/9, Colway 155 R13 remoulds courtesy of Watling tyres in Bexhill, glass from Hastings Glass Works and the interior carpet from the Vauxhall stand at the 1990 Motor Show. "They were throwing it away so we took





Seats are from a Datsun, carpet from Vauxhall's Motor Show stand and trim hand-made. Six Deta batteries offer 80 amps and a range of around 35 miles





The motor runs at 72 volts (left) under the front seats, controller (far left) mounted behind dash. On the road, Richelle is surprisingly quick off the mark and fine around town

home as much as we could carry," said Fairhurst wryly.

The body was to have been from flat panels, but what probably gives the car its special appeal — the Metro-like nose — is actually moulded in glass-fibre from a Sierra bonnet. The rear vertical panel is the same moulding turned on end, and the spare wheel neatly fits into it.

Climb into the Richelle, grab the Land Rover doorhandle ("burstproof", Fairhurst reminds us), and swing the door shut. It closes with a resounding 'clunk'. Nothing 'prefab' about that.

The driving position seems surprisingly high, though the steering wheel is right down in your lap, Alfa style. This is where it gets tricky, because in an electric car, co-ordination goes to pot as you try to grapple with a set of operations that are *almost* the same as a normal car, but not quite.

First, there's a large chrome switch (courtesy of the forklift again), to select forward and reverse. Once selected, the handbrake goes off, and you squeeze the throttle pedal. At this point things become distinctly unfamiliar as a sort of demented buzzing starts up from somewhere under the dash. The car doesn't move. More gas and the buzzing becomes a positive din and, finally, the Richelle moves smoothly backwards out of its parking space.

The noise comes from the 'thyristor chopper' and, frankly, it's hard to keep a straight face as you move off, with every slight change in throttle position rewarded by a change of warble. Best of all is when you put your foot to the floor and the wailing suddenly stops dead as though the beast responsible for it has suddenly been grabbed by the throat.

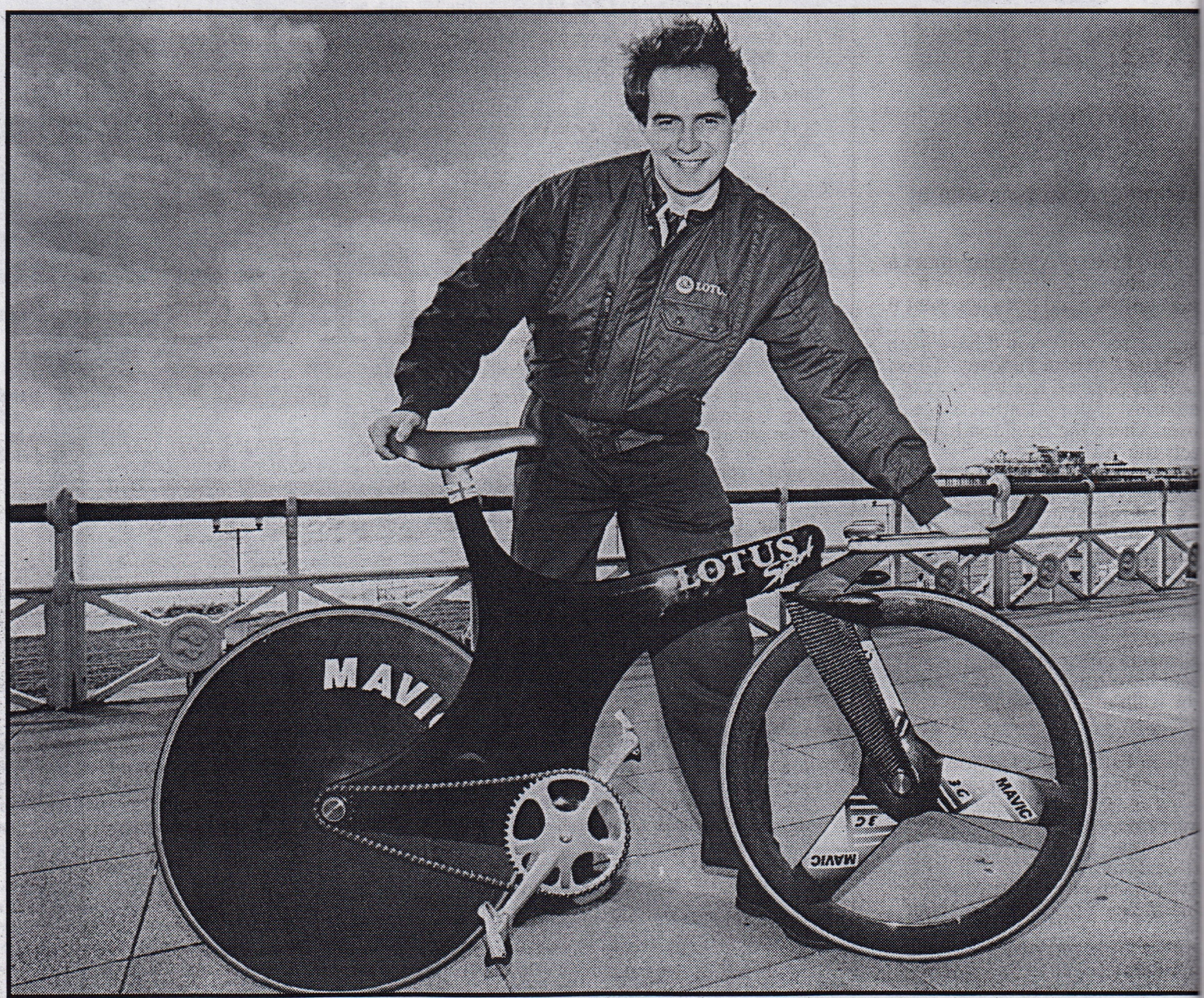
Response is impressive enough, though, and far from being a worrying liability at junctions, the little car literally leaps away. The steering is pretty heavy and the combination of short wheelbase and stiff van springing soon make their presence felt, too. Brakes are fine, even without power assistance, and yes, the performance is really quite acceptable around town.

The next stage, apart from introducing more sophisticated control electronics, will be to sort out some sort of demisting system. That aside, what's so impressive is how roomy the car is inside: it's certainly no two-seater. The cabin is spacious and visibility excellent. The trim, handmade by one of the girls, is surprisingly tidy, and the seats cleverly fold back to expose a removable panel covering the motor and batteries. It's an impressive package.

The car for the 1992 competition will probably be started next year. And Fairhurst, who has now been at St Richard's for 18 years, is looking for backers. He'd like to base the next car around Fiesta mechanicals, with 175-amp batteries and front-wheel drive. It would be nice to think that more people from the industry would be prepared to help out (some manufacturers showed little interest this time round) since this effort, despite the limitations of the basic components, shows considerable imagination.

"I'm interested in a serious alternative to the car," says Fairhurst, and means it. "We can claim this one is a true European. It's got German power, an Italian chassis and was built using British craftsmanship. What more can you want?" What more indeed. ■

Golden Superbike is star of the show



THE whole world was talking about the Superbike when cyclist Chris Boardman rode it to victory in the Barcelona Olympics.

Now it is on show in Brighton, one of the stars of a Seeboard Technology Fair at the Brighton Centre where it can be seen alongside an electric racing car.

by Keith Winsper

The car was built by pupils of St Richard's RC School at Bexhill, with help from Seeboard, Lotus Cars, developers of the bike, and Beta Batteries.

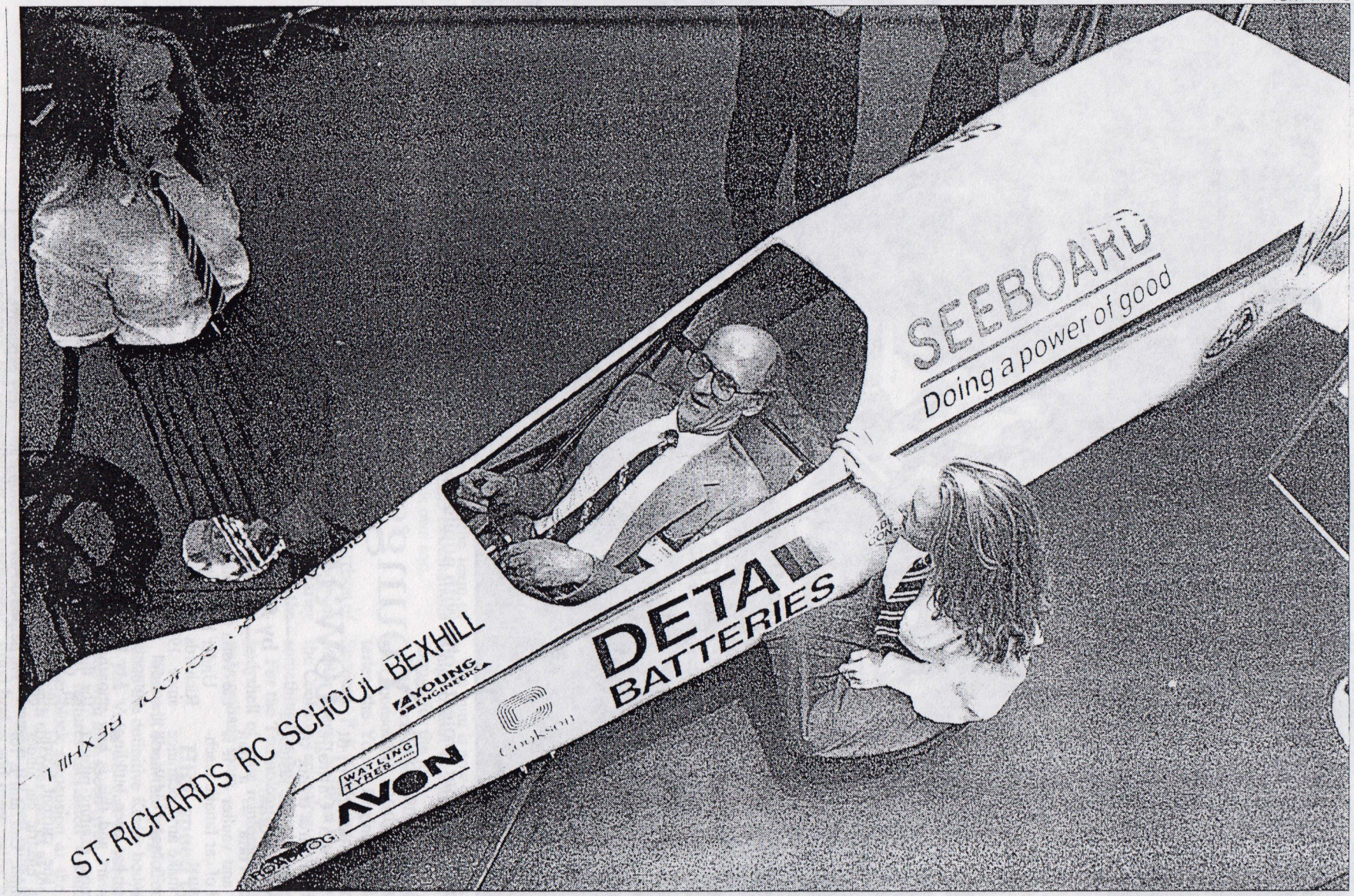
Pictured with the bike is former St Richard's pupil Matthew Harrison, 24, now a research engineer with Lotus who was involved with the school's project.

Seeboard is sponsoring the fair to reinforce its commitment to technology as the way forward for small and medium-sized companies and to highlight the range of expertise available in southern England and Europe.

Also on show is a battery-powered car built by International Automotive Design for use in smoggy Los Angeles.

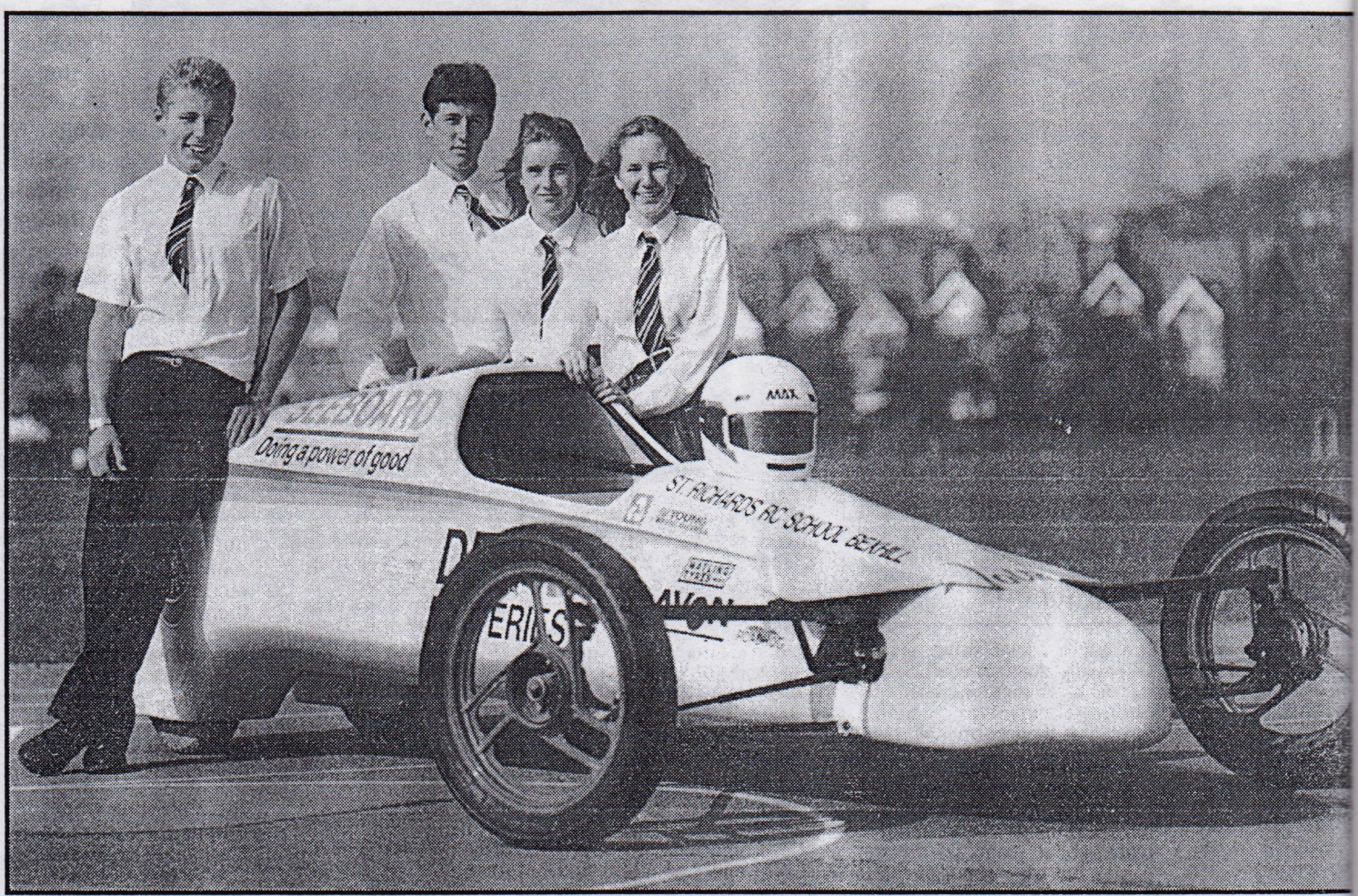
Exhibitors are from six countries and a wide range of industry. Stands have also been taken by research and development organisations.

TONY WHITE



Good little runner: Peter Fairhurst, technology teacher at St Richard's School, Bexhill, getting to grips yesterday with the machine that will try to break the 11-year-old world land speed record for lightweight electric cars. He is watched by pupils Vicky White, left, and Bella Harrison. The Seeboard technology fair at Brighton, is sponsored by Lotus Engineering but is being designed and developed as a private venture with pupils at the East Sussex school as well as battery, computer and engineering firms (Nick Nuttall writes). The Lotus team, which helped to propel the pursuit cyclist medal in Barcelona on a lightweight, streamlined bicycle, believes that by using similar materials and skills the car could reach more than 120mph over a one-kilometre flying start to beat the 100.242mph record set in 1981 by Jens Knoblock of Germany. The decision to work with the school, Mr Fairhurst, was made because several of the design team are former pupils of St Richard's or have family connections. The car will use a high-powered 45kw electric motor and standard lead acid batteries. Testing of the car is planned for the middle of next month and an attempt on the

Car with real power



Silver dream machine: Project Volta with pupils Chris Duncan, Ben Richardson, Vikki White and Bella Harrison.

Youngsters charge towards a record

by Alex Bellos

THIS sleek machine could drive a Sussex school into the record books.

Pupils past and present of St Richard's Roman Catholic School, Bexhill, are trying to make the electric car the fastest of its kind in the world.

Called the Volta — a pun between volt and vaulter — it is the brainchild of car fanatic teacher Peter Fairhurst.

It is due to make an appearance on television's Tomorrow's World on Wednesday.

Mr Fairhurst has been building cars for 35 years and this is his biggest and most exciting project so far.

He said: "The current world record for an electric car under 500kg is 100mph. Our aim is for the Volta to break 120mph."

Under his guidance pupils at St Richards have been building cars since 1976. Two years ago the school won the BP Buildacar competition.

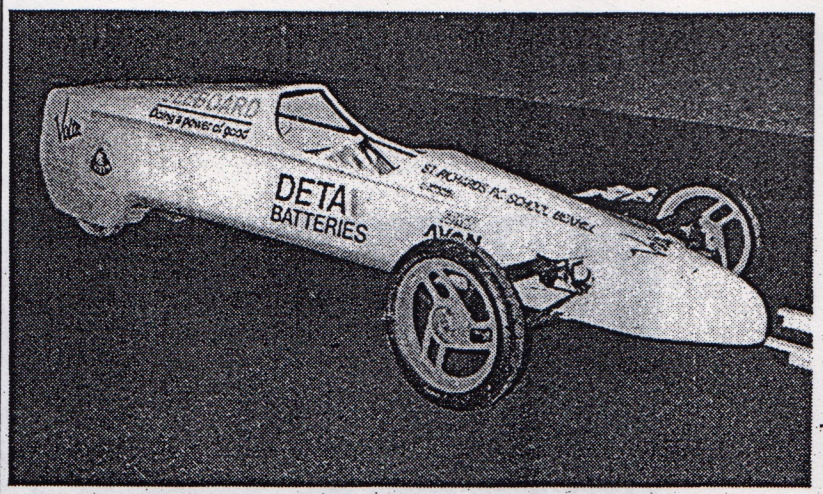
Mr Fairhurst said: "About 18 months ago we had the idea to go for the world speed record. I was in touch with some ex-pupils including one who is a research engineer for Lotus.

"He helped do all the complicated mathematics. The current pupils have been helping assemble the machine and learning about physics and design in the process."

The Volta is waiting for a special motor to be put in before it can be driven.

Mr Fairhurst hopes the £30,000 car will be finished in late October, but he says this will depend on whether he finds another sponsor for £5,000.

He added: "Companies have been very good to us helping us out financially but building cars is very expensive."



■ *St Richard's pupils, pictured right, hope this car they have built with expert help will be a flying success.*

School team's flying start to world record with new electric car

HOURS spent by four St Richard's School pupils in cutting metal and shaping glass–reinforced plastic reaped their reward when their efforts went on public display, ***writes*** **JOHN DOWLING.**

But the toughest test of the Volta car — latest product of the school which won the BP Buildacar competition — will come in the spring when the team of 15 year-olds goes for the world flying kilometre record for electric-powered cars.

The record was set at 161.424 km/h (100.242 mph) back in 1981 by Jens Knoblock at Germany's Hockenheim circuit.

Behind the project is school craft design technology teacher Peter Fairhurst, veteran of a string of school car projects since 1975 and culminating in the award-winning Richelle Buildacar entrant.

This time he has involved not only the team of four pupils working for their GCSE examinations but three former pupils including his own son.

Club quartet

Vicki White of Chantry Avenue; Bella Harrison of Harrow Road, St Leonards; Ben Richardson of Foxcote, St Leonards and Chris Duncan of Harley Shute Road, St Leonards have been working on the project at Peter Fairhurst's Rookhurst Road home. All are members of the school's Young Engineers' Club.

Contributing expertise is past pupil Matthew Harrison (1980-1985) who has an honours degree in engineering and is working for a Phd in computational fluid dynamics. He is a research engineer with Lotus Engineering and has helped with technical design.

Colin Sayers (1971-76) was a member of the first St Richard's Buildacar team who were finalists in 1976. As a sheet metal worker his main responsibility has been chassis welding and component fabrication.

Chris Fairhurst (1979-84) was a member of the 1980 and 1982 Buildacar teams and is a maintenance and repair mechanic. His responsibilities are mechanical assembly, development and test driving.

Peter Fairhurst says the Volta is a serious attempt at the world record with an objective of reaching 200 km/h (120mph).

Using the runway at RAF Elvington, the team hopes for both the flying kilometre and standing kilometre records.

Volta made its public debut at the Seeboard Technology Fair at the Brighton Centre, described as a "technology transfer exhibition."

Its aim is to promote the excellence of university research departments in working in conjunction with industry in Britain, France, Belgium, Holland and Germany.

Exhibitors include Kent, Surrey and Sussex Universities — and St Richard's School.

Peter Fairhurst says: "This is a school project but it has gone far beyond what anyone at this school can do. Matthew for instance has been calculating the power output needed to reach these speeds."

The hunt is now on for a manufacturer producing a high output 45 kilowatt electric motor that is light enough for the job.

One such is made — but costs £30,000 and even with sponsorship from Seeboard, Lotus, Deta Batteries, the Young Engineers' Clubs, Watling Tyre Services, F K Cableform, R D Power, Roadhog Motor Spares, NatWest Bank, D J Distribution and the Cookson Technology Centre the budget dictates something less exotic.

For the Technology Fair, the Volta was clad in a bodyshell of glass reinforced plastic built up over polyurethane foam.

High speed tyres

This will form the "plug" from which Lotus will make the definitive Kevlar bodyshell.

The Volta will run on motorcycle alloy wheels shod with high speed tyres.

It features fabricated wishbones with damped rubber-block suspension at the front and trailing arms with coil-over shocks at the rear.

The frame is flat oval mild steel tube. On-board drum brakes and regenerative braking will provide the stopping power — augmented by a parachute for the speed record attempt.

WATCH out for the Volta on an edition soon of television's Tomorrow's World.

Record bid planned

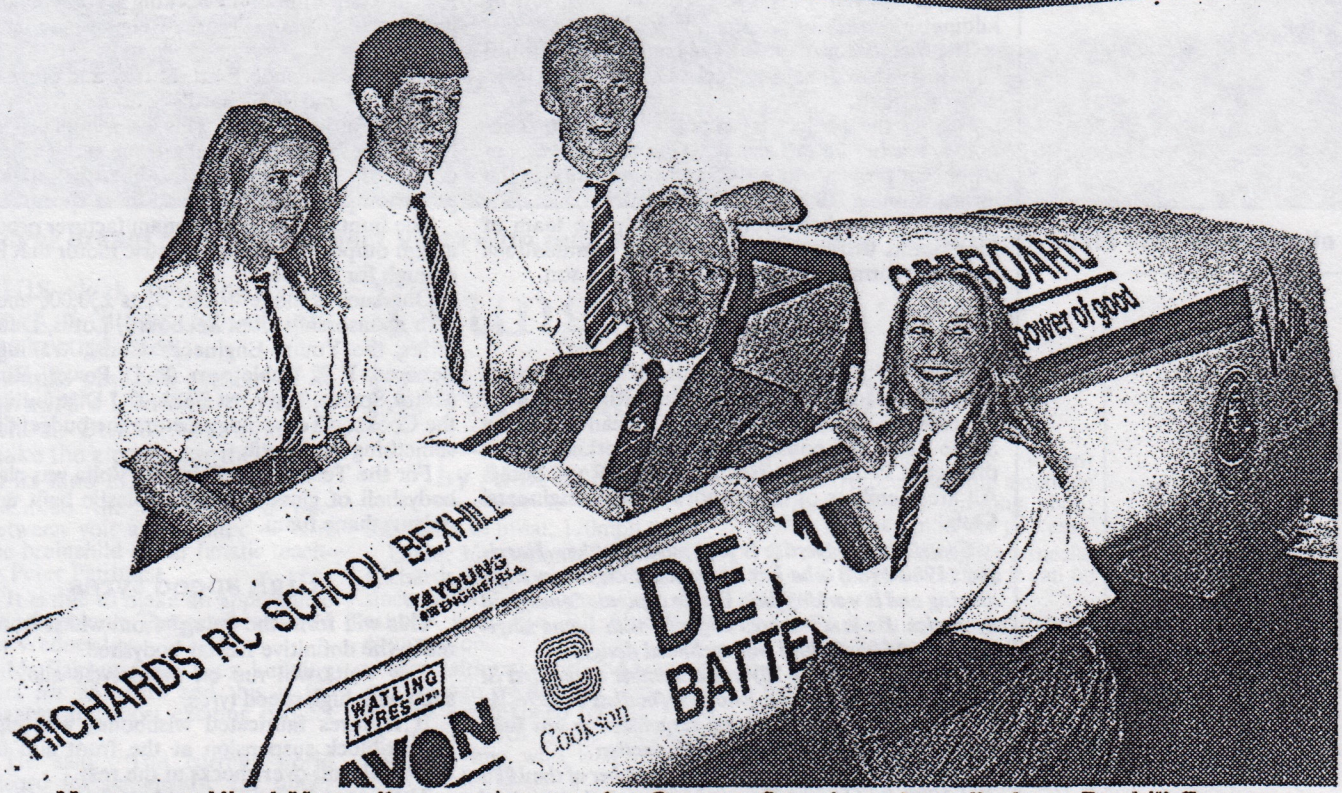
AN electric car, capable of travelling at 120 mph say its designers, caught attention on the Seeboard stand.

That speed is the target next Spring when the vehicle attempts an assault on the 11-year-old land speed record of 100.2 mph for electric cars.

The car is designed and built by a teacher and a seven-strong team of present and past pupils of St Richard's Roman Catholic School at Bexhill — with help from Seeboard, Lotus Cars and Deta Batteries.

The 45 kW dc motor is driven by a pack of lead-acid batteries. A braking system, which includes the use of a parachute, will be used to stop it!

Appropriately, Seeboard's stand at the Technology Fair was also graced by another vehicle in the forefront of new technology — the revolutionary Lotus racing bicycle which helped British cyclist Chris Boardman win Olympic gold in Barcelona this year.



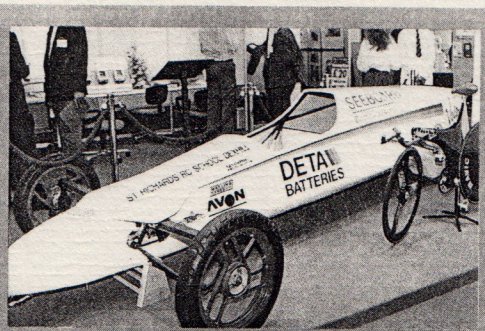
Move over Nigel Mansell . . . make way for George Squair and pupils from Bexhill Roman Catholic School with their electric racing car.

Pupils go for speed record

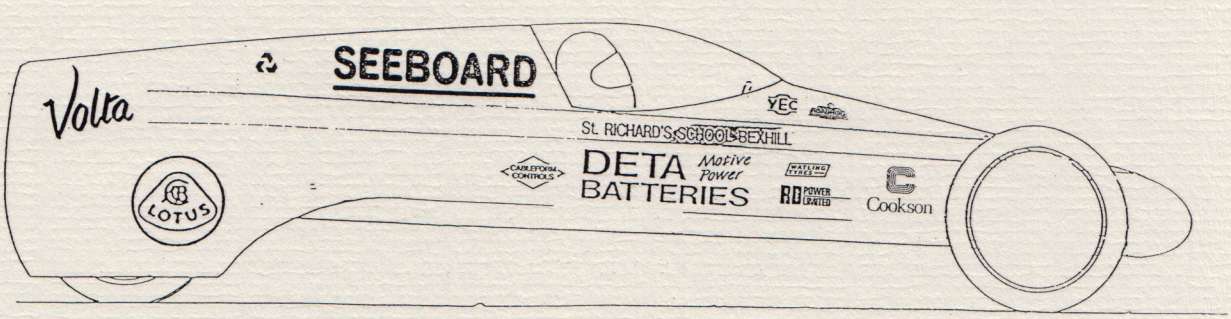
Pupils from St Richard's School, Bexhill, are hoping to break the 11 year–old land speed record for lightweight electric cars in a machine which they have designed themselves. It is expected to reach more than 190km/h, beating the 160km/h record set in 1981 by Jens Knoblock of Germany.

The car is the brainchild of metalwork teacher Peter Fairhurst, who started work on the car six months after his previous design, Richelle, won the 1990 BP "Buildacar" competition. Technical support came from former student Matthew Harrison, who now works for Lotus.

After £20,000 and 18 months' work by the school's engineering club, Lotus is stepping in. It hopes to make the body aerodynamically stable over a range of speeds. It will be made from two sheets of Kevlar stretched over a Nomex honeycomb shell and a steel space frame to form a



4m–long body weighing 16kg. The new body will retain its motorcycle running gear.

Harrison is negotiating with a motor manufacturer to develop a 45kW, 1,800rpm direct–drive motor which will fit a standard frame size. The motor will be powered for 50 seconds by eight 12V batteries from German company Deta.

The car will be driven by Lotus test driver and aerodynamicist Rudy Thomann.